REPORT ON

PETROLEUM CONTAMINATION INVESTIGATION BERLIN AND RIVER STREETS

CITY OF MONTPELIER
MONTPELIER, VERMONT

Submitted by
Dufresne-Henry, Inc.

February · 1992

DH Dufresne-Henry

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Engineering Disciplines
Civil
Environmental
Transportation
Municipal
Structural
Electrical
Mechanical

Associated Disciplines
Surveying
Construction Management
Applied Sciences
Water Quality
Geologic
Hydrologic
Computer

February 5, 1992

Mr. Stephen Gray
City of Montpelier
Office of the Public Works Director
City Hall, Main Street
Montpelier, Vermont 05602

Re: Berlin and River Streets
D-H #161024

Dear Mr Gray:

Dufresne-Henry has completed a Petroleum Contamination Investigation of the Berlin Street site in Montpelier, Vermont. Enclosed for your review is our final report regarding this evaluation, with supporting information.

This report has been compiled to outline the work completed on the site and is based upon the work plan submitted to the Vermont Hazardous Materials Management Division on December 10, 1991.

Please feel free to call us with any questions or comments regarding this report. Dufresne-Henry would be pleased to meet with representatives of the City of Montpelier to discuss the findings of this report if needed.

We appreciate this opportunity to provide the City of Montpelier with consulting engineering services.

Respectfully submitted,

DUFRESNE-HENRY, INC.

Theodore S. Reeves, P.E.
Environmental Services Division

Approved:

C. Jonathan Manning, P.E.
Vice President

TSR/CJM/rmn

Attachments

cc: Mr. Chuck Schwer - Vermont Hazardous Materials Management Division

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TABLE OF CONTENTS

LIST OF TABLES

CHAPTER 1

INTRODUCTION

During the spring of 1991, the Vermont Agency of Transportation (AOT) completed soil borings in the area of #162 Berlin Street and #11 River Street in Montpelier, Vermont. The purpose of these soil borings was to catalog subsurface conditions in the area of a proposed stormwater collection system outfall.

During the boring operation, gasoline contaminated soil was found. Further borings in the area, combined with groundwater monitoring wells installed later during the summer, determined that there was a strong presence of gasoline. As a result, the City of Montpelier requested proposals from consultants to complete a Petroleum Contamination Investigation. The purpose of this investigation was to determine the extent of the presence of the gasoline and propose remedial activities to remove any health threat to residences in the area.

The study area is largely a residential area in the southeast quadrant of the City of Montpelier. The immediate study area is bounded by Berlin Street on the south and River Street (U.S. Route 2) on the north. Further to the north of River Street is the Winooski River. The site slopes steeply to the north-northeast (see the attached Locus and Site Plans in Appendix A).

During a period until the early 1990's, a dairy was located on a property adjacent to the Berlin Street study area. This building was razed in 1990. During removal of the structure, an underground diesel fuel or #2 fuel oil tank was removed from the property.

No release of product was disclosed during the tank removal. The source of the gasoline on the site is still unknown; however, the presence of an underground gasoline tank on the former dairy site is a possibility.

Extensive construction is ongoing on Berlin Street concurrently with this investigation. Due to proposed reconstruction of the stormwater outfall and system, the work proposed as part of this investigation was delayed to avoid interference from construction activities and damage to monitoring wells. Damage was sustained to two of the existing monitoring wells with "stick-up" casings from construction activities. These are wells MW#1 and MW#3 completed by the AOT. An initial round of samples was successfully collected from these wells on October 14, 1991. Due to the damage to the "stick-up" casings, MW#3 could not be sampled again during the December 26, 1991 round of sample collection.

All residences in the entire study area are served with municipal sewer and water; therefore, no groundwater supplied potable water systems are at immediate risk.

CHAPTER 2

MONITORING WELL INSTALLATION

In April 1991, the State of Vermont AOT installed three groundwater monitoring wells in the area south of #162 Berlin Street and west of #11 River Street. Please see the site plan in Appendix A. These three wells are labeled as MW#1 through MW#3. In December 1991, Dufresne-Henry installed four additional shallow groundwater monitoring wells, which are labeled as DH#1 through DH#4. These wells were located in an array to identify hydrogeologic conditions, soils characteristics, the source of the product, and extent of the petroleum plume. The wells were installed using hollow stem augers driven by a track-mounted drill rig. Soil samples were obtained using a split spoon sampler at five-foot intervals during installation of the monitoring wells.

All of the wells were constructed within the hollow stem of the auger prior to the auger being withdrawn from the soil. The wells were constructed using two-inch PVC screen and sleeve, with flush joints. The borehole was filled using silica sand around the screened section of the well, and a bentonite clay seal was installed at the top of the sand pack to prevent surface water infiltration. Each well was capped with a "Buffalo" box grouted at the surface. The wells were installed such that the prevailing groundwater bisected the ten-foot screen section of the well. Soil boring logs and field logs are attached to this report as Appendix B.

During monitoring well installation, an HNU PI-101 photoionization detector (10.2 eV lamp) was used to scan soil samples from the auger flights and split spoon. Readings from the HNU were documented in the boring logs.

Generally, all of the wells, including those installed by the AOT, are on the order of sixteen to nineteen feet deep. Refusal was not encountered during installation of the wells.

During completion of the monitoring wells, specifically wells DH#1, DH#3, and DH#4, the presence of volatile organic compounds (VOC's) was confirmed with the HNU. Particularly high readings were found in DH#1, with the HNU reading over 300 parts per million (ppm) on one soil sample. DH#4 also had high readings of 140 to 150 ppm.

Since HNU readings were found to be very high in the boring completed for monitoring well DH#1, Dufresne-Henry consulted with representatives of the Vermont Hazardous Materials Management Division Sites Management Section (SMS). SMS approved installation of an additional monitoring well, DH#4, on the south side of #11 River Street. The purpose of this well was to determine any southward migration of contaminants.

The installation of monitoring wells and subsequent water quality monitoring were completed as outlined in the work plan, attached to this report as Appendix C.

CHAPTER 3

FIELD MONITORING AND SAMPLING ACTIVITIES

After completion of the monitoring well installation, a field location and topographic survey were completed by Dufresne-Henry personnel. This survey covered the immediate area of the Berlin Street study area and included residences, the monitoring well locations, and adjacent roads.

On October 14, 1991, groundwater samples were collected from the three monitoring wells installed by the AOT. In doing so, Dufresne-Henry was able to determine the present concentrations of the petroleum plume and plan the location of the proposed additional monitoring wells. The groundwater sampling was conducted in accordance with our work plan submitted to the SMS on December 10, 1991. These samples were preserved in a cooler with ice and shipped via overnight courier to Eastern Analytical, Inc. for analysis for benzene, toluene, ethylbenzene, and total xylenes (BTEX) and methyl-tertiary-butyl-ether (MTBE) by EPA method 602/8015. After these samples were received by Eastern Analytical, they were placed in a refrigerator for storage until the requested analysis could be performed. The results indicated that dissolved gasoline was present in wells MW#1 and MW#3, but not in MW#2.

On December 26, 1991, groundwater samples were collected from the monitoring wells installed by the AOT and Dufresne-Henry located at the Berlin Street study area.

During the sampling events, groundwater was measured prior to sampling the well. The data gathered during this portion of sampling assisted in developing groundwater potentiometric mapping, and aid in plume identification mapping. A groundwater

potentiometric map, a map identifying the benzene plume, a map identifying the total BTEX plume, and a map identifying the MTBE plume are attached to this report as Appendix D.

The water quality analysis results are attached to this report as Appendix E, and a discussion of the results is continued in Chapter 5 of this report.

During installation of groundwater monitoring wells on December 19, 1991, Dufresne-Henry personnel sought access to #11 River Street. An HNU PI-101 photoionization detector was used to scan ambient air at this residence along the west wall of the basement to determine migration of any vapors. None was detected at this time.

CHAPTER 4

SITE GEOLOGY AND HYDROGEOLOGY

Typically, the soils involved on this site are generally an olive brown silty sand to a fine sandy silt, the latter being found at greater depths in the soil borings. A layer of gravel was revealed during continuation of the boring for DH#2. No fill materials were identified in any of the borings.

The major feature influencing the site hydrogeology is the slope of the site. The site is located in the "Y" formed by Berlin Street and River Street. As Berlin Street continues to the south, it climbs steeply up a hill. River Street continues along the generally flat area along the Winooski River. This results in a slope between the two roads. Slope in the area is generally two percent or more. An old retaining wall is located at the west edge of the property of #11 River Street.

Because the study area is located significantly above the elevation of the Winooski River, the river does not seem to have an effect on the flow of groundwater in the area. The flow of groundwater is generally perpendicular to the slope of the land in the study area. Please see the Groundwater Potentiometric Map, attached in Appendix D.

One item of special note is that the former outfall structure for the stormwater system on Berlin Street appears to be a barrier, preventing northward migration of the contaminant plume. This is exemplified by the work completed by the AOT and the fact that no product has been identified in monitoring well DH#2.

CHAPTER 5

WATER QUALITY RESULTS

The groundwater quality sampling results indicate that a release of petroleum product (gasoline) has occurred in the study area. Levels of BTEX in the area immediately around #11 River Street are quite high; however, no free product was detected in any of the groundwater monitoring wells. The analysis results completed on the groundwater samples collected October 14, 1991 from monitoring wells MW#1, MW#2, and MW#3 are shown in Table I on the following page. The analysis results completed on the groundwater samples collected December 26, 1991 from monitoring wells MW#1, MW#2, DH#1, DH#2, DH#3, and DH#4 are shown in Table II. Note that a sample could not be recovered from MW#3 on December 26, 1991 due to damage to the "stick-up" casing.

The data in Tables I and II indicate the strong presence of gasoline at the site. Gasoline is very evident in monitoring wells MW#1, DH#1, DH#3, and DH#4. This suggests that the plume is fairly narrow, since monitoring wells MW#2 and DH#2 do not show any product. As suggested previously, the stormwater outflow structure is acting as a barrier to northward migration. However, we must also assume that it is also acting as a wick to promote eastward migration toward the Winooski River.

The analysis results indicate a fairly even distribution of total BTEX along a corridor extending from monitoring well MW#1 to DH#1 to DH#3. The highest level of total BTEX during the December sampling was found in monitoring well DH#3; however, the highest level of benzene was found in monitoring well DH#1.

CITY OF MONTPELIER – BERLIN STREET PETROLEUM CONTAMINATION INVESTIGATION
WATER QUALITY SAMPLING RESULTS

SAMPLES COLLECTED OCTOBER 14, 1991

SAMPLE NUMBER / PARAMETER *	MW#1	MW#2	MW#3	DH#1	DH#2	DH#3	DH#4	FIELD BLANK	SDWA
BENZENE	400	BDL	90					BDL	5
TOLUENE	4000	BDL	80					BDL	2000
ETHYLBENZENE	900	BDL	70					BDL	700
TOTAL XYLENES	5000	BDL	330					BDL	10000
TOTAL BTEX	10300	BDL	570					BDL	
METHYL–TERTIARY–BUTYL–ETHER	<2000	<20	<200					<20	

NOTE: SHADED VALUES EXCEED SAFE DRINKING WATER ACT (SDWA) LEVELS

BDL = BELOW DETECTION LIMITS

NT = NOT TESTED

* ALL CONCENTRATIONS IN ug/L (PARTS PER BILLION).

TABLE I

DH DufresneHenry

CITY OF MONTPELIER – BERLIN STREET PETROLEUM CONTAMINATION INVESTIGATION
WATER QUALITY SAMPLING RESULTS

SAMPLES COLLECTED DECEMBER 26, 1991

SAMPLE NUMBER / PARAMETER *	MW#1	MW#2	MW#3	DH#1	DH#2	DH#3	DH#4	FIELD BLANK	SDWA
BENZENE	2100	BDL		9700	BDL	3200	640	3.2	5
TOLUENE	5400	BDL		1500	BDL	3100	660	BDL	2000
ETHYLBENZENE	201	BDL		880	BDL	2900	BDL	BDL	700
TOTAL XYLENES	307	BDL		1600	BDL	510	130	BDL	10000
TOTAL BTEX	6008	BDL		9680	BDL	10010	1130	3.2	
METHYL–TERTIARY–BUTYL–ETHER	2500	<20		5700	BDL	762	1100	8	

NOTE: SHADED VALUES EXCEED SAFE DRINKING WATER ACT (SDWA) LEVELS

BDL = BELOW DETECTION LIMITS

NT = NOT TESTED

* ALL CONCENTRATIONS IN ug/L (PARTS PER BILLION).

TABLE II

DH DufresneHenry

CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Based on the field work completed to date on the Berlin Street site, it is clear that a release of gasoline has occurred upgradient of the immediate site. Speculation is that this release is from a gasoline tank that either exists on the former dairy site or which may have been recently removed from that location. The source of the gasoline plume and the upgradient extent of the plume have not yet been identified.

The lateral extent of the plume reaches at least to the western edge of the sidewalk on River Street and may possibly soon reach the waters of the Winooski River. Movement of the plume toward the Winooski River is likely to be aided by the disturbed soils and bedding materials used in the trench for the stormwater system outfall.

No vapor presence was determined in the basement of #11 River Street using an HNU PI-101 photoionization detector; however, vapor migration to this point may occur in the near future. A footing drain was not located for this residence, but if a drain does exist it should be located and effluent from the drain analyzed for BTEX to determine if it is acting as a receptor to the gasoline plume.

Plume mapping confirms that the highest levels of total BTEX and benzene exist in the area around monitoring wells DH#1 and DH#3. Monitoring well DH#4 is also affected and, with time, may show higher levels of dissolved product.

Recommendations

Based on the work completed in this study, Dufresne-Henry recommends continued monitoring on this site in the wells installed by the AOT and Dufresne-Henry. This sampling and analysis should occur at least once each quarter.

To protect the residents of #11 River Street, we recommend that ambient air sampling be initiated immediately and continued monthly until remediation is effectively operating or it is demonstrated that vapors are not migrating into the basement.

Since neither the sourcenor westerly, southwesterly, southeasterly, and easterly boundaries of the plume have been identified, we recommend additional groundwater monitoring wells be installed within the study area. These wells should be installed in locations upgradient, and throughout the study area in a larger radius to identify lateral extents of the plume.

The "stick-up casing for monitoring well MW#3 should also be repaired to allow for future groundwater sampling.

Possible Remediation

Possible remediation technologies appropriate for this site include soil venting and dissolved product treatment. Soil venting is a system where a blower draws a vacuum on the soil structure, causing air to volatilize VOC's in the soil. In doing so, the VOC's desorb and are removed from the soil. Dissolved product treatment typically involves pumping groundwater and treating it prior to discharging the water. Several methods of treatment technologies and discharge options are available.

Remediation of adsorbed material would be completed by a soil venting system. The slow permeability of the soil, which may hinder free product recovery by pumping technologies, will not necessarily hamper treatment by soil venting. Second, the air

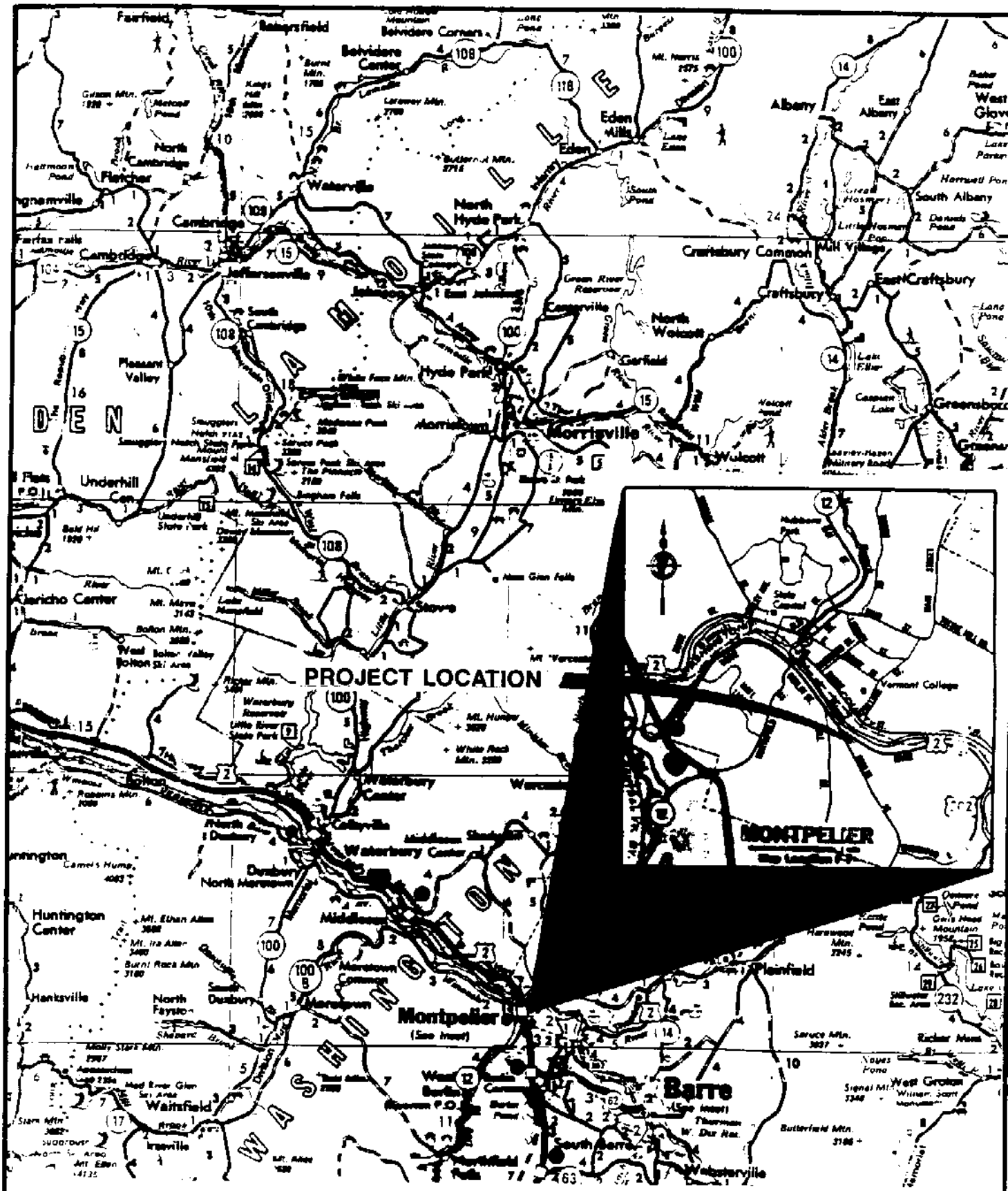
changes within the soil structure will assist with aerobic biodegradation of the product in-situ. A small scale soil vent treatment system may be installed at this site to document the applicability of the soil vent system for treatment of the adsorbed product. With documented success from this unit, a soil vent system can be expanded to include the entire site if needed. Soil venting should reduce the dissolved total BTEX on the site. One drawback to soil venting at this site is that an impermeable cover is not in place, which assists in drawing gasses from specific areas of the treatment site. Dufresne-Henry recommends pursuing soil venting as a remedial technology for this site.

Aerobic and anaerobic degradation are also likely to occur at this site as a result of the soil venting activities. Both aerobic and anaerobic degradation are measurable in the soil vent system off gases as methane and carbon dioxide. Other methods for tracking the success of biological degradation of product in-situ is by microbiological assays and quantitative analysis.

Dissolved product remediation (dissolved total BTEX) is not recommended at this time for this site, since the effort required versus expected mass recovery would likely be small. In addition, a system for dissolved product recovery and/or treatment would entail a high initial investment, and high operation and maintenance costs.

APPENDIX A

Site and Locus Plans



LOCATION PLAN

NOT TO SCALE

Client No.	161024
Proj. Mgr.	T.S.R.
Date	02/92

CITY OF MONTPELIER

PETROLEUM CONTAMINATION INVESTEGATION

MONTPELIER, VERMONT

DuBoseHenry Inc.

A

BRUNING 44-232 45337-13

LEGEND

- SURVEY TRAVERSE STATION
- MONITORING WELL
- MANHOLE
- CATCH BASIN
- HYDRANT
- WATER SHUT OFF
- UTILITY POLE
- STEEL GUARD RAIL
- IRON PIN
- TEMP. BENCH MARK
- STONE RETAINING WALL

BERLIN STREET

TBM#2

#162 BERLIN ST.

GARAGE

APPROX. LOCATION DRAINAGE STRUCTURE AND PIPING

MW#1

REROD FND.

IP

MW#2

MW#3

DH#1

DH#2

DH#3

DH#4

SHED

HOUSE

GARAGE

#13 RIVER ST.

#11 RIVER ST.

CONC. SIDEWALK

RIVER STREET

GRAVEL

PAVED

APPROX. LOCATION DRAINAGE STRUCTURE AND PIPING

36" CGMP INV. 524.6

	GRND.	CASING
MW#1	563.3	566.63
MW#2	552.4	554.62
MW#3	553.1	555.04
DH#1	548.81	
DH#2	548.7	
DH#3	535.9	
DH#4	540.5	

NOTES:

1. ELEVATIONS ARE BASED ON TBM#2 BEING A CHISELED SQUARE ON THE S.E. CORNER OF D.I. @ EL. 574.82 AS SHOWN ON PLAN PREPARED BY VT. A.O.T. FOR BERLIN STREET RECONSTRUCTION, DATED APRIL 1991.
2. TOPOGRAPHY TAKEN WITH SNOW PRESENT AND MAY BE SUBJECT TO REVISION.
3. NORTH IS MAGNETIC.

30 0 15 30 60

GRAPHIC SCALE
1 inch = 30 ft.

Dufresne-Henry Inc.
Precision Park
No. Springfield, Vermont 05150

CITY OF MONTPELIER
BERLIN STREET PETROLEUM CONTAMINATION INVESTIGATION

SITE PLAN

MONTPELIER, VERMONT

Client No. 161024	Proj. Mgr. T.S.R.	Date 1/16/92	B	

APPENDIX B

Boring Logs

Petroleum Contamination Study
Berlin Street/River Street
Montpelier, Vermont

12/19/91

Dufresne-Henry, Inc. (Bruce Cox) on-site at 9:00 am±.
Soils Engineering, Inc. (Myron Domingue, Richard Holmes) on-site at 9:00 am±.
I tried to speak with an occupant at #11 River Street at 9:15 am±. There was no answer.
A State inspector for the Berlin Street project was on-site at 10:00 am±. He had seen the installation of the 48" CMP but has no ties to the pipe. He said if all work was done outside the drainage easement there would be no interference with the pipe. He knew of no other underground utilities at the spots I noted as proposed boring locations.

MW DH1

Started boring at 10:37 am. The rig and tools had been steam cleaned prior to arrival on-site. Water used for washing split spoons and other tools was obtained from a gas station (Gulf?) on River Street. Drilled with 4 1/4" hollow stem augers taking split spoon soil samples at 5 foot intervals. All soil samples were screened for VOC's with an HNU PI-101 (10.2 eV lamp). Representative soil samples (not for chemical analysis) were stored in clear glass jars and retained by Dufresne-Henry. Total depth of the boring was 17' with no refusal. The general geologic section consists of silty sand to a depth of 16'6" with till below that to the depth of the boring. The water table was encountered at 8' - 9' during drilling. Soil contaminated with petroleum product was encountered below 10'6" to the depth of the boring. The product was identified as gasoline based on odor. Odor was noted as strong to slight with HNU readings of 300 ppm to 50 ppm over the interval above. A soil sample from the 10' - 12' sample for possible chemical analysis was obtained at 11:25 am and placed in a cooler. Installed a 2", .010" slot, threaded, flush joint, SCHD 40 PVC well at 15'. All pipe came from factory sealed plastic bags. The annular space as backfilled with silica sand to 4'. A bentonite pellet seal was installed from 32" - 48". A Buffalo box was grouted in flush at the ground surface. All excess soil was put in the drainage easement. Finished at 12:45 pm.

Materials:
10' of 2", .010" slot, threaded, flush joint, SCHD 40 PVC.
4'10" of 2", solid wall, threaded, flush joint, SCHD 40 PVC.
225 lb± of silica sand.
25 lb± of bentonite pellets.
50 lb± of cement mix.
1 threaded PVC cap.
1 expanding gasket cap.
1 Buffalo box.

MW DH2

Started boring at 12:55 pm. Used clean augers (not previously used on the job). The bit and split spoon were washed in ALCONOX. Water used for washing split spoons and other tools was obtained from a gas station (Gulf?) on River Street. Drilled with 4 1/4" hollow stem augers taking split spoon soil samples at 5 foot intervals. All soil samples were screened for VOC's with an HNU PI-101 (10.2 eV lamp). Representative soil samples (not for

chemical analysis) were stored in clear glass jars and retained by Dufresne-Henry. No contamination (visual or odor) was observed in the samples or on the tools. No HNU readings were observed. Total depth of the boring was 17' with no refusal. The general geologic section consists of silty sand to a depth of about 13' with till below that to the depth of the boring. The water table was encountered at 8' - 9' during drilling. Installed a 2", .010" slot, threaded, flush joint, SCHD 40 PVC well at 15'. All pipe came from factory sealed plastic bags. The annular space was backfilled with silica sand to 42". A bentonite pellet seal was installed from 32" - 42". A Buffalo box was grouted in flush with the ground surface. All excess soil was put in the drainage easement. Finished at 3:00 pm±.

Materials: 10' of 2", .010" slot, threaded, flush joint, SCHD 40 PVC.
4'10" of 2", solid wall, threaded, flush joint, SCHD 40 PVC.
250 lb± of silica sand.
25 lb± of bentonite pellets.
50 lb± of cement mix.
1 threaded PVC cap.
1 expanding gasket cap.
1 Buffalo box.

I called Ted Reeves at 1:15 pm± and told him about the gasoline discovered behind #11 River Street. I said it was possible that product was on both sides of the house. He said he would call the State about an additional boring(s). I noted that the area upgradient of the driveways for #11 and #13 River Street was a likely location for the boring.
I called Ted back at 2:45 pm±. No word from the State; proceed with last proposed well.
Soils Engineering took the tow truck and steam cleaner to the City DPW garage as it closed at 4:00 pm.

MW DH3

Started boring at 3:50 pm. Used clean augers (not previously used on the job). The bit and split spoon were washed in ALCONOX. Water used for washing the split spoons and other tools was obtained from a gas station (Gulf?) on River Street. Drilled with 4 1/4" hollow stem augers taking split spoon soil samples at 5 foot intervals. All soil samples were screened for VOC's using an HNU PI-101 (10.2 eV lamp). Representative soil samples (not for chemical analysis) were stored in clear glass jars and retained by Dufresne-Henry. At 8' - 10' wet soil with a moderate gasoline odor was encountered while augering. A soil sample from the auger flights for possible chemical analysis was obtained at 4:25 pm. The boring was temporarily stopped at 10'.

At 4:36 pm I was allowed access to the basement of #11 River Street by a resident. Upon entry no gasoline odor was observed. No HNU readings at the wall by MW DH1 or at any other point were observed. The resident said he had never noted any gasoline odors in the basement.

Left the site at 4:40 pm.
Weather: sunny, calm - light breeze, temp; below 0 am, lower teens pm.
Visitors: State inspector for the Berlin Street project.

12/20/91

DH (BHC) on-site at 8:10 am.

SEI (MD, RH) on-site at 8:05am.
I called Ted Reeves at 8:05 am. State gave permission to do an additional boring as proposed.
I spoke with the owner of #11 and #13 River Street concerning putting in the additional well. He gave approval for the boring and said the proposed location was alright.
I spoke with Tom(?) McArdle at the Montpelier DPW at 8:30 am± about underground utilities in the vicinity of the new boring. He said he would have someone check the location.
A DPW employee was on-site at 9:10 am to check the proposed boring location. The location as proposed was OK.

MW DH3 (continued)

Continued boring with 4 1/4" hollow stem augers. A slight gasoline odor was noted below 10' with HNU readings to 10 ppm. At 16'6" no odor was noted with HNU readings of 2 ppm. Installed a 2", .010" slot, threaded, flush joint, SCHD 40 PVC well at 15'. All pipe came from factory sealed plastic bags. The annular space was backfilled with silica sand to 4'. A bentonite pellet seal was installed from 38" - 48". A Buffalo box was grouted in flush at the ground surface. Excess soil was put in the drainage easement. Finished at 10:05 am±.

Materials:
10' of 2", .010" slot, threaded, flush joint, SCHD 40 PVC.
4'10" of 2", solid wall, threaded, flush joint, SCHD 40 PVC.
250 lb± of silica sand.
25 lb± of bentonite pellets.
50 lb± of cement mix.
1 threaded PVC cap.
1 expanding gasket cap.
1 Buffalo box.

MW DH4

Started boring at 10:20 am±. Used clean augers (from MW DH2). The bit and split spoon were washed in ALCONOX. Water for washing split spoons and other tools was obtained at a gas station (Gulf?) on River Street. Drilled with 4 1/4" hollow stem augers taking split spoon soil samples at 5 foot intervals. All samples were screened for VOC's using an HNU PI-101 (10.2 eV lamp). Representative soil samples (not for chemical analysis) were stored in clear glass jars and retained by Dufresne-Henry. Total depth of the boring was 16'6" with no refusal. The water table was encountered at 5'±. The general geologic section consists of silty sand to the depth of the boring. A moderate gasoline odor was observed in the upper part of the 15' - 16.5' sample with HNU readings of 140 - 150 ppm. A soil sample from the spoon for possible chemical analysis was obtained at 11:35 am. Installed a 2", .010" slot, threaded, flush joint, SCHD 40 PVC well at 15'. All pipe came from factory sealed plastic bags. The annular space was backfilled with silica sand to 4'. A bentonite pellet seal was installed from 36" - 48". A Buffalo box was grouted in flush at the ground surface. Excess soil was put in the drainage easement. Finished at 1:00 pm.

Materials:
10' of 2", .010" slot, threaded, flush joint, SCHD 40 PVC.
4'10" of 2", solid wall, threaded, flush joint, SCHD 40 PVC.
250 lb± of silica sand.
25 lb± of bentonite pellets.
50 lb± of cement mix.
1 threaded PVC cap.

1 expanding gasket cap.
1 Buffalo box.

Left site at 1:42 pm.
Weather: sunny, light breeze, temp; singles am, teens - 20 pm
Visitors: none

BORING LOCATION MW DH1 INCLINATION V BEARING DATE START/FINISH 12/19/91 / 12/19/91

CASING ID CORE SIZE TOTAL DEPTH 17 FT DRILLED BY: SOILS ENGINEERING, INC. (M.D.)

GROUND EL (MSL) 548.8 DEPTH TO WATER/DATE 8 - 9 FT/ IMMED. LOGGED BY: B. COX

ELEV MSL FT	SAMPLE DEPTH FT	SAMPLE TYPE AND NO.	SAMPLE B	SAMP OD IN	LENGTH REC IN	LENGTH PENETRATION IN	REMARKS ON ADVANCE OF BORING	SIZE/TYPE BIT USED TO ADVANCE BORING	SOIL AND ROCK DESCRIPTION
543.8	5						4 1/4" HSA	8"/CCH	0" - 6"± Medium - dark brown, silty, sandy, ORGANIC SOIL. 6" - 5' Medium brown, sandy SILT. Very fine - fine grained, well sorted sand. 50%± non plastic fines. Several inches of ashes and cinders below topsoil. Moist. No odor or staining. 0 ppm.
541.8	7	SS 1	23 21 17 15	2	20	24			Medium gray brown, dense, silty SAND. Very fine - fine grained, well sorted sand. 40%+ non plastic fines. Occasional thin (1/8"±) light brown, fine - medium grained sand layers. Trace fine, tabular schist fragments to 1/4". Trace very fine, faint, discontinuous, medium - dark orange mottles. Moist. No odor or staining. 0 ppm.
538.8	10						4 1/4" HSA	8"/CCH	Easier drilling at 8' - 9' (water table).
536.8	12	SS 2	8 11 12 13	2	20	24			10' - 10'6" Silty SAND as above. Saturated. 10'6" - 11'± Black SAND. Fine - medium grained sand. Strong gasoline odor. Saturated. 300 ppm. 11' - 12' Medium gray brown, medium dense, silty SAND as above. Saturated. Odor less apparent than above. 300 ppm.
533.8	15						4 1/4" HSA	8"/CCH	Probable SAND similar to above.
531.8	17	SS 3	15 19 65 82	2	21	24			15' - 16' Medium brown, medium dense - dense SAND Medium grained, well sorted sand. 10%± non plastic fines. Saturated. Moderately strong gasoline odor. 50 - 60 ppm. 16' - 16'6" Medium - dark brown, silty SAND. Very fine - fine grained sand. 10%+ non plastic fines. Wet. 50 - 60 ppm. 16'6" - 17' Medium brown, very dense, silty, TILL Very fine - fine grained, well sorted sand. 40%+ non plastic fines. Damp. Slight - moderate gasoline odor. 50 - 60 ppm.
									No refusal to depth. Set 10' of 2", .010" slot, threaded, flush joint SCHD 40 PVC at 15'. Sand backfill to 4'. Bentonite seal 32" - 48". Grouted in flush Buffalo box.

B - Penetration resistance, Blows/6" of a 140 lb hammer falling 30 in to drive a split spoon sampler.
REC - Length of sample recovered.
SS - Split spoon sample.
U - Undisturbed samples
S - Shelby tube N - Denison
F - Fixed piston P - Pitcher
O - Osterberg
SAMP OD - Outside diameter of sampling spoon

NOTES

HSA = Hollow Stem Auger
CCH = Conical Cutter Head
ppm: Refers to HNU reading (10.2 eV lamp)

City of Montpelier
Berlin Street

Montpelier, Vermont

DATE: 12/19/91 PROJECT: 161024

PAGE 1 OF 1 LOG OF BORING: DH1

DH DUFRESNE-HENRY, INC.

BORING LOCATION MW DH2 INCLINATION V BEARING DATE START/FINISH 12/19/91 / 12/19/91

CASING ID CORE SIZE TOTAL DEPTH 17 FT DRILLED BY: SOILS ENGINEERING, INC. (M.D.)

GROUND EL (MSL) 548.7 DEPTH TO WATER/DATE 8 - 9 FT/ IMMED. LOGGED BY: B. COX

ELEV MSL FT	SAMPLE DEPTH FT	SAMPLE TYPE AND NO.	SAMPLE B	SAMP OD IN	LENGTH REC IN	LENGTH PENETRATION IN	REMARKS ON ADVANCE OF BORING	SIZE/TYPE BIT USED TO ADVANCE BORING	SOIL AND ROCK DESCRIPTION
543.7	5						4 1/4" HSA	8"/CCH	0" - 4"± Medium - dark brown, silty, sandy, ORGANIC SOIL. 4" - 5' Medium gray brown, silty SAND. Moist. No odor or staining. 0 ppm.
541.7	7	SS 1	11 13 12 11	2	24	24			Medium gray brown, medium dense, silty SAND. Very fine - fine grained, well sorted sand. 30% - 40% non plastic fines. Trace very thin (1/16"±), faint, discontinuous, light - medium orange mottles throughout. Moist. No odor or staining. 0 ppm.
438.7	10						4 1/4" HSA	8"/CCH	Probable silty SAND similar to above. Water at 8' - 9'.
536.7	12	SS 2	7 11 11 10	2	19	24			10' - 11'10" Medium brown, medium dense, silty SAND as above. Trace of rock fragments. Saturated. No odor or staining. 0 ppm. 11'10" - 12' Medium brown SAND. Predominately medium grained, well sorted sand. Saturated. No odor or staining. 0 ppm.
533.7	15						4 1/4" HSA	8"/CCH	Becoming denser at 13'±.
531.7	17	SS 3	36 56 42 45	2	15	24			Medium brown gray, very dense, silty TILL. Very fine - fine grained, moderately well sorted sand. 30%+ non plastic fines. 10% - 20% fine, subrounded - rounded gravel of weathered and unweathered rock fragments. Wet. No odor or staining. 0 ppm
									No refusal to depth. Set 10' of 2", .010" slot, threaded, flush joint SCHD 40 PVC at 15'. Sand backfill to 42". Bentonite seal 32" - 42". Grouted in flush Buffalo box.

B - Penetration resistance, Blows/6" of a 140 lb hammer falling 30 in to drive a split spoon sampler.
REC - Length of sample recovered.
SS - Split spoon sample.
U - Undisturbed samples
S - Shelby tube N - Denison
F - Fixed piston P - Pitcher
O - Osterberg
SAMP OD - Outside diameter of sampling spoon

NOTES

HSA = Hollow Stem Auger
CCH = Conical Cutter Head
ppm: refers to HNU reading (10.2 eV lamp)

City of Montpelier
Berlin Street

Montpelier, Vermont

DATE: 12/19/91 PROJECT: 161024

PAGE 1 OF 1 LOG OF BORING: DH2

DH DUFRESNE-HENRY, INC.

BORING LOCATION MW DH3 INCLINATION V BEARING DATE START/FINISH 12/19/91 / 12/20/91

CASING ID CORE SIZE TOTAL DEPTH 16.5 FT DRILLED BY: SOILS ENGINEERING, INC. (M.D.)

GROUND EL (MSL) 535.9 DEPTH TO WATER/DATE 8 - 9 FT/ IMMED. LOGGED BY: B. COX

ELEV MSL FT	SAMPLE DEPTH FT	SAMPLE TYPE AND NO.	SAMPLE B	SAMP OD IN	LENGTH REC IN	LENGTH PENETRATION IN	REMARKS ON ADVANCE OF BORING	SIZE/TYPE BIT USED TO ADVANCE BORING	SOIL AND ROCK DESCRIPTION
530.9	5						4 1/4" HSA	8"/CCH	0" - 4"+ Medium - dark brown, silty, sandy, ORGANIC SOIL. 4" - 5' Till-like FILL. Moist. No odor or staining. 0 ppm.
528.9	7	SS 1	5 10 9 12	2	8	24			Medium brown, medium dense, till-like FILL. Very fine - occasionally coarse grained, poorly sorted sand. 20% - 30% non plastic fines. 10%+ fine, rounded gravel to 3/4". Slight organic odor. Moist. 0 ppm.
525.9	10						4 1/4" HSA	8"/CCH	Easier drilling at 8' - 9' (water table). Moderate gasoline odor.
523.9	12	SS 2	25 17 17 22	2	21	24	12/20/91		Medium brown, dense, silty SAND. Very fine - fine grained, well sorted sand. 30%+ non plastic fines Saturated. Slight - moderate gasoline odor. 5 - 10 ppm.
520.9	15						4 1/4" HSA	8"/CCH	Probable silty SAND as above.
519.4	16.5	SS 3	26 30 51	2	18	18			Medium brown gray - medium gray, very dense, silty SAND. Very fine - fine grained, well sorted sand. 30% - 40% non plastic fines. Abundant silty layers. Occasional layers (to 1/4") of medium grained sand. Faint layering throughout. Damp. Slight gasoline odor. 2 ppm.
									No refusal to depth. Set 10' of 2", .010" slot, threaded, flush joint SCHD 40 PVC at 15'. Sand backfill to 48". Bentonite seal 38" - 48". Grouted in flush Buffalo box.

B - Penetration resistance, Blows/6" of a 140 lb hammer falling 30 in to drive a split spoon sampler.
REC - Length of sample recovered.
SS - Split spoon sample.
U - Undisturbed samples
S - Shelby tube N - Denison
F - Fixed piston P - Pitcher
O - Osterberg
SAMP OD - Outside diameter of sampling spoon

NOTES

HSA = Hollow Stem Auger
CCH = Conical Cutter Head
ppm: Refers to HNU reading (10.2 eV lamp)

City of Montpelier
Berlin Street

Montpelier, Vermont

DATE: 12/20/91 PROJECT: 161024

LOG OF BORING: DH3

DH DUFRESNE-HENRY, INC.

BORING LOCATION MW DH4 INCLINATION V BEARING DATE START/FINISH 12/20/91 / 12/20/91

CASING ID CORE SIZE TOTAL DEPTH 16.5 FT DRILLED BY: SOILS ENGINEERING, INC. (M.D.)

GROUND EL (MSL) 540.5 DEPTH TO WATER/DATE 5± FT/ IMMED. LOGGED BY: B. COX

ELEV MSL FT	SAMPLE DEPTH FT	SAMPLE TYPE AND NO.	SAMPLE B	SAMP OD IN	LENGTH REC IN	LENGTH PENETRATION IN	REMARKS ON ADVANCE OF BORING	SIZE/TYPE BIT USED TO ADVANCE BORING	SOIL AND ROCK DESCRIPTION
535.5	5						4 1/4" HSA	8"/CCH	0" - 4"± Medium - dark brown, silty, sandy, ORGANIC SOIL. 4" - 5' Medium brown, silty SAND. Moist - wet. No odor or staining. 0 ppm.
533.5	7	SS 1	10 9 9 9	2	19	24			Medium brown gray, medium dense, silty SAND. Very fine - fine grained, well sorted sand. 30% - 40% non plastic fines. Occasional rock fragments, often very weathered and oxidized. Saturated. No odor or staining. 0 ppm.
530.5	10						4 1/4" HSA	8"/CCH	Probable SAND as above.
528.5	12	SS 2	5 7 9 16	2	14	24			Medium brown gray (becomes grayer with depth), loose - medium dense, silty SAND similar to above. 40%± non plastic fines. Trace very coarse sand. Very faint layering. Saturated. No odor or staining. 0 ppm.
525.5	15						4 1/4" HSA	8"/CCH	Slightly cobbley at 14'6"±.
524.0	16.5	SS 3	10 22 33	2	18	18			Medium brown gray, dense - very dense, silty SAND similar to above. Occasional layers of coarser sand. Moderate gasoline odor in upper part of sample. Wet - saturated. 140 - 150 ppm.
									No refusal to depth. Set 10' of 2", .010" slot, threaded, flush joint SCHD 40 PVC at 15'. Sand backfill to 4'. Bentonite seal 36" - 48". Grouted in flush Buffalo box.

B - Penetration resistance, Blows/6" of a 140 lb hammer falling 30 in to drive a split spoon sampler.
REC - Length of sample recovered.
SS - Split spoon sample.
U - Undisturbed samples
S - Shelby tube N - Denison
F - Fixed piston P - Pitcher
O - Osterberg
SAMP OD - Outside diameter of sampling spoon

NOTES

HSA = Hollow Stem Auger
CCH = Conical Cutter Head
ppm: Refers to HNU reading (10.2 eV lamp)

City of Montpelier
Berlin Street

Montpelier, Vermont

DATE: 12/20/91 PROJECT: 161024

PAGE 1 OF 1 LOG OF BORING: DH4

DH DUFRESNE-HENRY, INC.

Soils Engineering Inc.

Main St. Charlestown, N. H. 03603

SHEET 1 OF 1

TO DUFRESNE-HENRY ENGINEERING ADDRESS NORTH SPRINGFIELD, VT

PROJECT NAME BERLIN STREET LOCATION MONTPELIER, VT

REPORT SENT TO BRUCE COX PROJ. NO.

SAMPLE SENT TO RETAINED BY DUFRESNE-HENRY ENGINEERING OUR JOB NO. 5283-91

DATE 12/19/91

HOLE NO. MW-DH1

LINE & STA.

OFFSET

GROUND WATER OBSERVATIONS

At 8'6" at Hours

At at Hours

	CASING	SAMPLER	CORE BAR.
Type		SS	
Size I. D.		1 1/2"	
Hammer Wt.			BIT
Hammer Fall			

SURFACE ELEV.

DATE STARTED 12/19/91

DATE COMPL. 12/19/91

BORING FOREMAN M.D. & R.H.

INSPECTOR B. COX

SOILS ENGR.

LOCATION OF BORING:

DEPTH	Casing Blows per foot	Sample Depths From — To	Type of Sample	Blows per 6" on Sampler From 0-6	To 6-12	To 12-18	Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE No.	Pen	Rec.
5'		5' - 7'	SS	23	21				OLIVE BROWN FINE SANDY SILT WITH FINE SAND LAYERS	1	24"	20"
				17	15							
10'		10' - 12'	SS	8	11		WET		OLIVE BROWN SILTY SAND	2	24"	20"
				12	13			11'	DARK LAYER WITH HYDROGEN ODOR			
15'		15' - 17'	SS	15	19				VERY DENSE OLIVE BROWN GRAVELLY SANDY SILT	3	24"	20"
				65	82			16'				
20'									INSTALLED 2" PVC WELL @ 15' SLOTTED 5' - 15' SAND TO 4' BENTONITE 3' - 4' MATERIALS USED: 10' OF 2" PVC 0.010" SLOTTED 5' OF 2" PVC SOLID 25# OF BENTONITE 250# OF SAND 1 BUFFALO CAP 1 THREADED PVC CAP 1 EXPANSION			

GROUND SURFACE TO 17' USED "CASING: THEN

Sample Type

D—Dry C—Cored W—Washed

UP—Undisturbed Piston

TP—Test Pit A—Auger V—Vane Test

UT—Undisturbed Thinwall

Proportions Used			
trace	0	to	10 %
little	10	to	20 %
some	20	to	35 %
and	35	to	50 %

140 lb. Wt. x 30" fall on 2" O. D. Sampler

Cohesionless Density		Cohesive Consistency	
0-10	Loose	0-4	Soft
10-30	Med. Dense	4-8	M/Stiff
30-50	Dense	8-15	Stiff
50 +	Very Dense	15-30	V-Stiff
		30 +	Hard

SUMMARY

Earth Boring 17'

Rock Coring

Samples 3

HOLE NO. MW-DH1

BRUNING 40-5070 70/92

Soils Engineering Inc.

Main St. Charlestown, N. H. 03603

SHEET 1 OF 1

TO DUFRESNE-HENRY ENGINEERING ADDRESS NORTH SPRINGFIELD, VT

PROJECT NAME BERLIN STREET LOCATION MONTPELIER, VT

REPORT SENT TO BRUCE COX PROJ. NO.

SAMPLE SENT TO RETAINED BY DUFRESNE-HENRY ENGINEERING OUR JOB NO. 5283-91

DATE 12/19/91

HOLE NO. DH-2

LINE & STA.

OFFSET

GROUND WATER OBSERVATIONS

At 8' at Hours

At at Hours

	CASING	SAMPLER	CORE BAR.
Type	HSA	SS	
Size I. D.	4"	1 1/2"	
Hammer Wt.			BIT
Hammer Fall			

SURFACE ELEV.

DATE STARTED 12/19/91

DATE COMPL. 12/19/91

BORING FOREMAN M.D. & R.H.

INSPECTOR B. COX

SOILS ENGR.

LOCATION OF BORING:

DEPTH	Casing Blows per foot	Sample Depths From — To	Type of Sample	Blows per 6" on Sampler From 0-6	To 6-12	To 12-18	Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE No.	Pen	Rec.
5'		5' - 7'	SS	11	13				OLIVE BROWN SILTY SAND WITH OCCASIONAL GRAVEL			
				12	11							
10'		10' - 12'	SS	7	11		WET		SAME MATERIAL	1	24"	20"
				11	10							
15'		15' - 17'	SS	36	56			14'6"		2	24"	18"
				42	45				OLIVE BROWN GRAVELLY SILTY FINE SAND			
								17'				
20'									INSTALLED 2" PVC WELL @ 15' SLOTTED 5' - 15' SAND TO 4' BENTONITE 3' - 4' MATERIALS USED: 10' OF 2" PVC 0.010" SLOTTED 5' OF 2" PVC SOLID 25# OF BENTONITE 250# OF SAND 1 BUFFALO CAP 1 PVC SLIP CAP 1 EXPANSION	3	24"	16"

GROUND SURFACE TO 17' USED "CASING: THEN

Sample Type

D—Dry C—Cored W—Washed

UP—Undisturbed Piston

TP—Test Pit A—Auger V—Vane Test

UT—Undisturbed Thinwall

Proportions Used

trace	0	to	10 %
little	10	to	20 %
some	20	to	35 %
and	35	to	50 %

140 lb. Wt. x 30" fall on 2" O. D. Sampler

Cohesionless Density

0-10	Loose
10-30	Med. Dense
30-50	Dense
50 +	Very Dense

Cohesive Consistency

0-4	Soft
4-8	M/Stiff
8-15	Stiff
15-30	V-Stiff
30 +	Hard

SUMMARY

Earth Boring 17'

Rock Coring

Samples 3

HOLE NO. DH-2

BRUNING 40-5020 70792

Soils Engineering Inc.

Main St. Charlestown, N. H. 03603

SHEET 1 OF 1

TO DUFRESNE-HENRY ENGINEERING ADDRESS NORTH SPRINGFIELD, VT

PROJECT NAME BERLIN STREET LOCATION MONTPELIER, VT

REPORT SENT TO BRUCE COX PROJ. NO.

SAMPLE SENT TO RETAINED BY DUFRESNE-HENRY ENGINEERING OUR JOB NO. 5283-91

DATE 12/19/91

HOLE NO. DH-3

LINE & STA.

OFFSET

GROUND WATER OBSERVATIONS

At 8' at Hours

At at Hours

	CASING	SAMPLER	CORE BAR.
Type	HSA	SS	
Size I. D.	4"	1 1/2"	
Hammer Wt.			BIT
Hammer Fall			

SURFACE ELEV.

DATE STARTED 12/19/91

DATE COMPL. 12/20/91

BORING FOREMAN M.D. & R.H.

INSPECTOR B. COX

SOILS ENGR.

LOCATION OF BORING:

DEPTH	Casing Blows per foot	Sample Depths From — To	Type of Sample	Blows per 6" on Sampler From 0-6	To 6-12	To 12-18	Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE No.	Pen	Rec.
5'		5' - 7'	SS	5	10				BROWN GRAVELLY SAND	1	24"	8"
				9	12							
10'		10' - 12'	SS	25	17		WET		OLIVE BROWN FINE SILTY SAND	2	24"	20"
				17	22				GAS ODOR			
15'		15' - 16'6"	SS	26	30				SAME MATERIAL	3	18"	18"
				51				16'6"				
20'									INSTALLED 2" PVC WELL @ 15'6" SLOTTED 5'6" - 15'6" SAND TO 4' BENTONITE 3' - 4' MATERIALS USED: 10' OF 2" PVC 0.010" SLOTTED 5' OF 2" PVC SOLID 25# OF BENTONITE 250# OF SAND 1 BUFFALO CAP 1 THREADED PVC CAP 1 EXPANSION			

GROUND SURFACE TO 16'6" USED "CASING: THEN

Sample Type

D—Dry C—Cored W—Washed

UP—Undisturbed Piston

TP—Test Pit A—Auger V—Vane Test

UT—Undisturbed Thinwall

Proportions Used

trace	0	to	10 %
little	10	to	20 %
some	20	to	35 %
and	35	to	50 %

140 lb. Wt. x 30" fall on 2" O. D. Sampler

Cohesionless Density

0-10	Loose
10-30	Med. Dense
30-50	Dense
50 +	Very Dense

Cohesive Consistency

0-4	Soft
4-8	M/Stiff
8-15	Stiff
15-30	V-Stiff
30 +	Hard

SUMMARY

Earth Boring 16'6"

Rock Coring

Samples 3

HOLE NO. DH-3

BRUNING 40-5020 70792

Soils Engineering Inc.

Main St. Charlestown, N. H. 03603

SHEET 1 OF 1
DATE 12/20/91
HOLE NO. DH-4
LINE & STA.
OFFSET

TO DUFRESNE-HENRY ENGINEERING ADDRESS NORTH SPRINGFIELD, VT
PROJECT NAME BERLIN STREET LOCATION MONTPELIER, VT
REPORT SENT TO BRUCE COX PROJ. NO.
SAMPLE SENT TO RETAINED BY DUFRESNE-HENRY ENGINEERING OUR JOB NO. 5283-91

GROUND WATER OBSERVATIONS

At 8' at Hours

At at Hours

	CASING	SAMPLER	CORE BAR
Type	HSA	SS	
Size I. D.	4"	1 1/2"	
Hammer Wt.			BIT
Hammer Fall			

SURFACE ELEV.
DATE STARTED 12/20/91
DATE COMPL. 12/20/91
BORING FOREMAN M.D. & R.H.
INSPECTOR B. COX
SOILS ENGR.

LOCATION OF BORING:

DEPTH	Casing Blows per foot	Sample Depths From — To	Type of Sample	Blows per 6" on Sampler From 0-6	To 6-12	To 12-18	Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks Include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE No.	Pen	Rec.
5'		5' - 7'	SS	10	9				OLIVE BROWN VERY FINE SILTY SAND	1	24"	20"
				9	9							
10'		10' - 12'	SS	5	7				SAME MATERIAL	2	24"	18"
				9	16							
15'		15' - 16'6"	SS	10	22				OLIVE BROWN FINE GRAVELLY SILTY	3	18"	16"
				33					FINE SAND			
								16'6"	GAS ODOR			
20'									INSTALLED 2" PVC WELL @ 15'			
									SLOTTED 5' - 15'			
									SAND TO 4'			
									BENTONITE 3' - 4'			
									MATERIALS USED:			
									10' OF 2" PVC 0.010" SLOTTED			
									5' OF 2" PVC SOLID			
									25# OF BENTONITE			
									250# OF SAND			
									80# OF CEMENT (TOTAL FOR JOB)			
									1 BUFFALO CAP			
									1 PVC SLIP CAP			
									1 EXPANSION			

GROUND SURFACE TO 16'6" USED "CASING: THEN

Sample Type
D—Dry C—Cored W—Washed
UP—Undisturbed Piston
TP—Test Pit A—Auger V—Vane Test
UT—Undisturbed Thinwall

Proportions Used	
trace	0 to 10%
little	10 to 20%
some	20 to 35%
and	35 to 50%

140 lb. Wt. x 30" fall on 2" O. D. Sampler

Cohesionless Density	
0-10	Loose
10-30	Med. Dense
30-50	Dense
50 +	Very Dense

Cohesive Consistency	
0-4	Soft
4-8	M/Stiff
8-15	Stiff
15-30	V-Stiff
30 +	Hard

SUMMARY
Earth Boring 16'6"
Rock Coring
Samples 3

HOLE NO. DH-4

BRUNING 40-5020 10/92

APPENDIX C

Work Plan

Proposed Work Plan
Installation of Monitoring Wells

CITY OF MONTPELIER; BERLIN STREET
PETROLEUM CONTAMINATION ASSESSMENT

This work plan outlines the boring and monitoring well program proposed for the vicinity of 162 Berlin Street in Montpelier, Vermont. Construction activities in the area encountered petroleum contaminated soil. A boring program conducted by the State of Vermont Agency of Transportation provided a preliminary assessment of the plume extent and hydrogeologic conditions. Subsequent test pits by the contractor further defined the plume.

The proposed monitoring wells will be used to further define the extent of the contamination plume and provide additional hydrogeologic data. The number and location of the borings have been chosen with these purposes in mind. It is anticipated that three wells will be installed. A site plan of proposed well locations will be found attached. All wells will be surveyed to determine the elevation of the top of casing. A specific aim of the program is to determine if the trench for the existing 36" stormwater culvert is providing an effective barrier to the northerly migration of contamination. All borings and monitoring well installations will be performed by Soils Engineering, Inc. of Charlestown, New Hampshire under the field supervision of Dufresne-Henry personnel. All personnel on the site are OSHA certified for hazardous site operations under 29 CFR part 1910.120.

BORINGS

It is anticipated that the borings for the monitoring wells will be done using 4 1/4" hollow stem augers. Hollow stem augers offer the advantages of minimal hole caving, ease of geologic sampling, and relatively easy monitoring well installation. They generally are the most cost effective method given the expected subsurface conditions. Monitoring well borings will be taken to a depth of 5' into the prevailing groundwater table or to refusal, whichever occurs first. Petroleum based pipe dope for use on drill rods, tools, or casing will not be allowed. No type of drilling mud, including polymers, will be used. Should flowing sands be encountered, clean water obtained locally will be used to increase hydraulic head. If flowing sands are particularly problematic, casing will be used.

SOIL SAMPLING

Soil samples will typically be taken at 5 foot intervals using a split spoon sampler. Sampling at other intervals may occur and will be a field decision of the Dufresne-Henry inspector. Possible reasons include abrupt changes in drill rate and suspected, or known, zones of contamination. The split spoon sampler allows retrieval of relatively undisturbed soil samples from a known depth for classification and Volatile Organic Compound (VOC) screening. All soil samples and material from the auger flights will be screened for VOC's with an HNU PI-101 photoionization detector (10.2 eV lamp). The act of driving the sampler (Standard Penetration Test) also gives an indication of the density or degree of compaction of the soil. Representative samples from each spoon will be placed in glass jars and retained by Dufresne-Henry. These are for project records only and are not intended for chemical analysis. Detailed logs of geology, drilling data, and HNU readings will be prepared for each boring. Soil samples for laboratory analysis are not anticipated as part of this project. Water quality samples will not be obtained during the boring program.

MONITORING WELLS

Monitoring wells will be constructed from 2", 0.010" machine slot, threaded, flush joint, Schedule 40 PVC. Assuming no refusal, each monitoring well will consist of 10' of screen with sufficient riser to reach approximately 2" below the surface grade. The bottom of the well will be set such that approximately 5 feet of screen extends above and below the water table observed at the time of installation. For wells with shallow depth to the water table, the screened interval will be a decision of the Dufresne-Henry inspector. The bottom of all wells will be provided with a PVC cap or point or a plug with an expanding gasket. The annular space between the auger and the screen will be carefully backfilled with clean silica sand to create a filter pack around the well. The filter pack will extend from the bottom of the well to approximately 2 feet above the screen. At that point a seal will be installed consisting of about 1 foot of bentonite pellets. The remainder of the hole will be backfilled with native soil to about 2 feet from the surface. Another bentonite seal will be installed and a cast iron water box (Buffalo box) will be grouted in flush at the surface. All wells will have removable top caps for sampling and sounding.

WATER QUALITY SAMPLING TECHNIQUES
Quality Assurance Document

Introduction

Sample collection for groundwater monitoring wells is performed with polyvinyl chloride (PVC) bailers for samples which are analyzed for inorganic parameters, and by Teflon bailers for organic parameters. Surface water samples are hand grab samples. All samples are collected in suitable containers and refrigerated and/or field preserved as appropriate until delivered to a certified laboratory for analysis. Samples are delivered to the laboratory as soon as possible and in all circumstances within the recommended delivery time for specific parameters. A Chain of Custody record is kept for each sample location and sampling occurrence.

Monitoring Wells

The casing and well guard are inspected for signs of vandalism or damage. The condition of the ground surface at the well head is examined for signs of surface water infiltration. Information regarding condition is noted as well as information regarding identification of the lock and key. Well casing diameter is noted. Weather conditions are noted as well as any recent rainfall or drought conditions.

Upgradient wells ("clean") are sampled prior to downgradient wells. Static water level is determined using an electronic water sounder or a tape and weight with an accuracy of ± 0.01 foot. Measurements are recorded to the nearest 0.02 foot from the top of the protective steel casing or monitoring well casing. The PVC bailer is washed with a non-ionic phosphate free detergent and rinsed with distilled water. The depth to the bottom of the well is determined and the volume of water required for purging is calculated. A minimum of three volumes of static water in the well is purged. The purged water is discarded. Teflon bailers are used for sample collection. The Teflon bailers are washed with detergent and rinsed with distilled water between sampling locations.

The color, odor, and turbidity of the sample is noted. Samples are obtained for parameters required for the specific well. An example of the parameters typically obtained immediately after the well has been flushed are: chemical oxygen demand (COD), chloride, and site specific metals. Samples may also be obtained for nitrates, calcium, manganese, sulfates, total organic compounds, total halogenated organic compounds, and volatile organic compounds. If volatile organic analysis (VOA) is required, these samples are obtained first. The VOA sample is slowly released into a clean VOA vial with as little disturbance to the sample as possible. The vial cap is retained in the hand during the process with the Teflon seal protected from all contamination. No free gases are permitted in the sample.

All samples which will be analyzed for dissolved metals and COD are field filtered using a pressurized 0.45u filter. Samples are placed in containers provided by the certified laboratory and labeled with an identification number, date, and method of preservation.

Surface Water Sampling

Hand grab samples are collected at surface water sampling locations.

Samples are obtained from mid-depth of the water column in a field cleaned sampling device. Samples which will be analyzed for dissolved metals, COD, and which have observable turbidity are filtered with a 0.045u filter and immediately preserved. Field parameters of temperature, pH, and specific conductance are also measured in the water column. Conditions in the vicinity of the sampling location are noted, depth of sample below water surface, and general flow conditions.

Sample Preservation and Handling

Samples collected which require fixing with preservative chemicals are placed in sample containers with the appropriate reagent. The samples are placed in insulated chests with ice packs or ice. Samples are kept refrigerated until they are delivered to the laboratory no later than allowable according to the holding times determined by Standard Methods. Sampling personnel contact the laboratory personnel regarding sampling delivery and analysis.

Record Keeping

Field data sheets are utilized to reconstruct sampling conditions at any time after sampling. These sheets shall contain all information regarding the site: name, date, time of sampling, weather, ambient air temperature, identification numbers, and sampler's name. Field data is to include information regarding the condition of the well head and casing, well specifics (total depth, static water level, diameter, length of casing above grade, volume of water purged), sampling date (equipment used, depth sample obtained, physical properties of sample), field measurements of pH, conductivity, temperature, and the number and type of sample containers.

Chain of custody record for all samples shall be maintained. A sample shall be considered to be in the custody of an individual if it is in the direct view of, or otherwise controlled by, the individual in custody. Storage of samples during custody shall be accomplished according to established preservation techniques in appropriately sealed and numbered storage containers. Chain of custody shall be maintained during the exchange of the samples or sealed sample container directly transferred from one individual to the next with the former custodian witnessing the signature of the recipient on the chain of custody record. Chain of custody forms shall contain the following information: sample location names, field identification numbers, signature of collector, date and time of collection, number of containers transferred, parameters for analysis, all signatures of individuals involved in the chain of possession, description of sample condition, and any comments regarding sample collection.

Quality Assurance and Control

To check the integrity of field sampling and equipment cleaning techniques, the following field control procedures are used. Field blanks, and occasionally trip blanks, are used as control or external QA/QC samples to detect contamination that may be introduced in the filed (atmospheric or from sampling equipment), in transit to or from the sampling site, during bottle preparation, and sample log-in or storage.

A "trip blank" follows all samples through the sampling period. The trip blank is prepared at the laboratory using organic-free water and is

kept with the sample containers and samples at all times. It is not opened and is analyzed with the other samples obtained. If this sample is accidentally opened, it is noted in the chain of custody records. The trip blank is commonly used for quality control on volatile organic analyses.

A "field blank" is collected after sampling a well that previously indicated high concentrations of the water quality parameters analyzed. The sampling equipment is cleansed and a sample of distilled water is obtained using the sampling equipment. The distilled water sample is then used to prepare the field blank.

A sample replicate is used periodically to provide quality assurance for the laboratory analysis techniques. A sample is split in the field and provided to the laboratory in two or more sampling containers.

Decontamination of Field Equipment

All filed equipment is rinsed with de-ionized or distilled water. This includes the electronic water sounder probe, the bailer winch spool, Teflon coated bailer wire, filter unit, and bailers. In addition, the bailers are disassembled, washed with a non-phosphate detergent, and rinsed with pressurized distilled water.

Site Health and Safety

All sampling personnel shall receive an annual medical examination to determine the baseline physiological condition. Appropriate blood chemistry work and x-rays are taken as required.

Protective clothing is worn by all site technicians during sampling. This clothing includes protective rubberized overalls, rubber gloves, and steel-toed boots. Full-face respirators with organic filter cartridges, combustible gas and oxygen detection meters, and photoionization detectors are available for the sampler's protection.

Upon arrival at the site a visual survey is performed to determine the safety of the work place. No water quality testing is performed if there is any evidence of hazardous waste disposal or the uncovering of suspected hazardous materials. Upon arrival at a monitoring well location, the cap is removed from an upwind position. The well head is allowed to vent for at least five minutes while sampling equipment is set up. No smoking or use of flammable materials is permitted adjacent to a well head.

Data Transaction, Reduction and Report Generation

Data analysis and interpretation are the responsibility of the Project Manager or Project Team member responsible for a particular task of the project. The data are compiled in table form for ease of presentation to highlight the significant information. The data may be input into the computer and plotted on various types of graphs and maps, or analyzed by various statistical methods.

Sampling Protocol Addendum for: City of Montpelier
Berlin Street

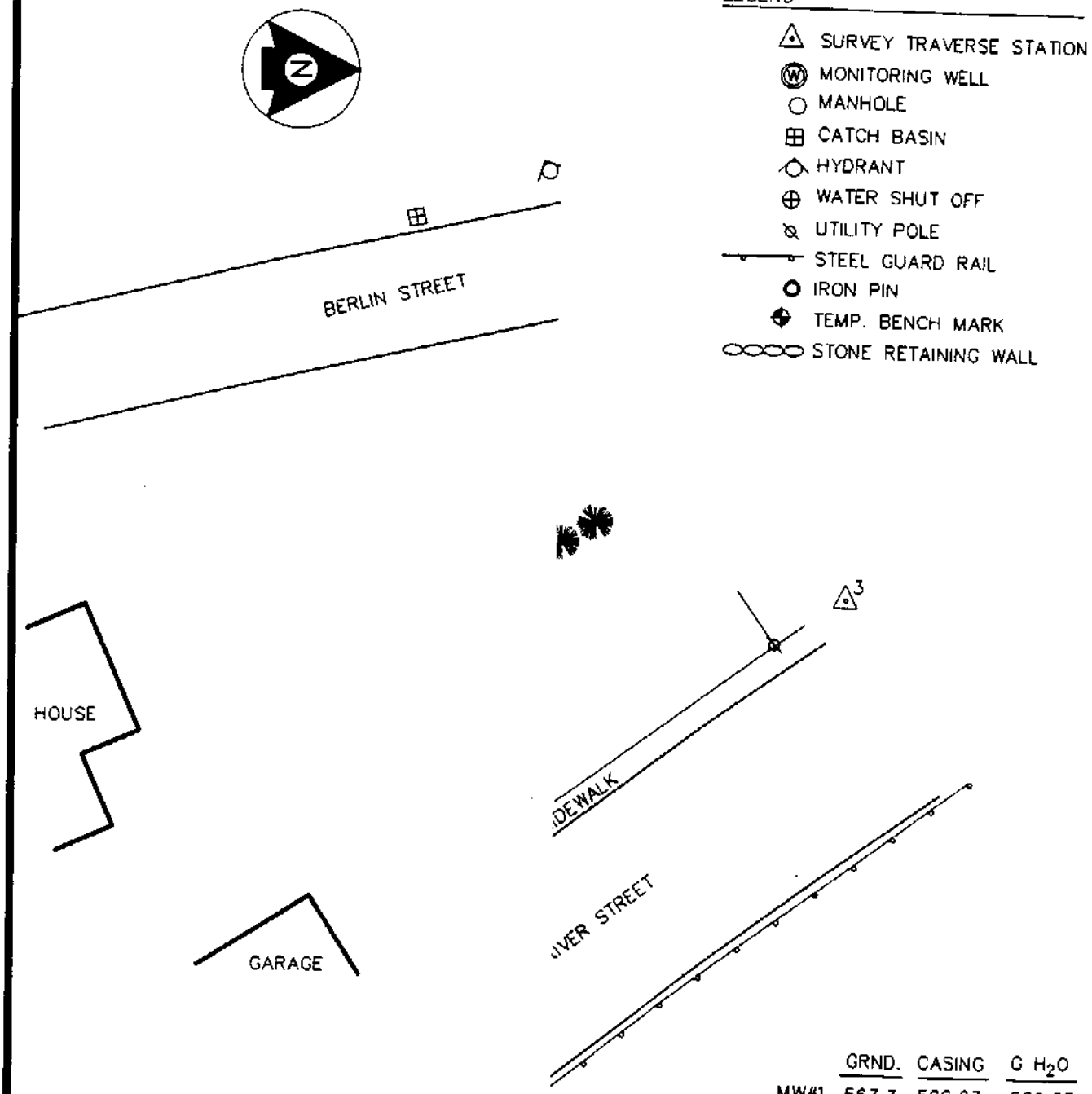
1. The person(s) sampling the wells will utilize an HNU photoionization detector. Immediately upon removal of the well cap, the HNU will be used to make a preliminary determination as to the VOC activity in the well.

2. A Teflon bailer will then be lowered into the well to check for the presence of free product floating on the groundwater surface. If free product is found, the well will be purged until product ceases to be observed. The well will be allowed to recover and be repurged and checked for free product. If free product is again observed, no water quality samples will be taken. If free product is not observed, the well will be sounded, purged, and sampled as outlined above.

3. Water samples will be forwarded to a contract laboratory. Analysis will be for the volatile organic compounds "BTEX" and MTBE by EPA method 8015.

APPENDIX D

BTEX and MTBE Isoconcentration Maps



	GRND.	CASING	G H_2O
MW#1	563.3	566.63	550.05
MW#2	552.4	554.62	549.16
MW#3	553.1	555.04	543.66
DH#1	548.81		539.36
DH#2	548.7		540.0
DH#3	535.9		530.0
DH#4	540.5		533.3

NOTES:

1. ELEVATIONS ARE BASED ON TBM#2 BEING A CH SQUARE ON THE S.E. CORNER OF D.I. @ EL. 57 AS SHOWN ON PLAN PREPARED BY VT. A.O.T. FOR BERLIN STREET RECONSTRUCTION, DATED A
2. TOPOGRAPHY TAKEN WITH SNOW PRESENT AND SUBJECT TO REVISION.
3. NORTH IS MAGNETIC.

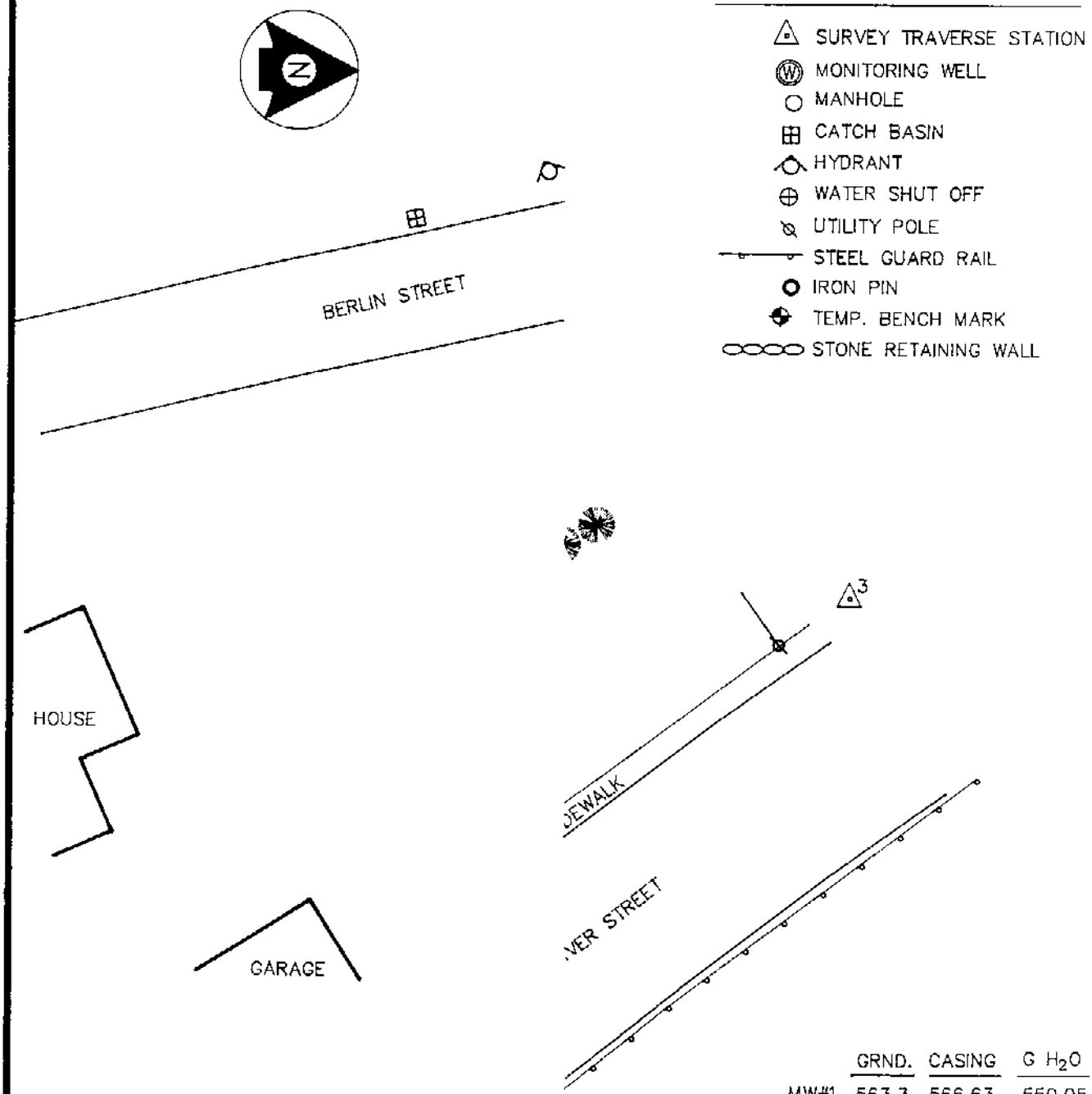
NOTE: GROUNDWATER ELEVATIONS AS OF 12/26/91

CITY OF MONTPELIER
REET PETROLEUM CONTAMINATION INVESTIGATION

JNDWATER POTENTIOMETRIC MAP

R,
VERMONT

161024	Proj. Mgr. T.S.R.	Date 1/16/92	B	



	GRND.	CASING	G H_2O
MW#1	563.3	566.63	550.05
MW#2	552.4	554.62	549.16
MW#3	553.1	555.04	543.66
DH#1	548.81		539.36
DH#2	548.7		540.0
DH#3	535.9		530.0
DH#4	540.5		533.3

CGMP
524.6

NOTES:

1. ELEVATIONS ARE BASED ON TBM#2 BEING A CHI SQUARE ON THE S.E. CORNER OF D.I. @ EL. 574 AS SHOWN ON PLAN PREPARED BY VT. A.O.T. FOR BERLIN STREET RECONSTRUCTION, DATED AF
2. TOPOGRAPHY TAKEN WITH SNOW PRESENT AND M SUBJECT TO REVISION.
3. NORTH IS MAGNETIC.

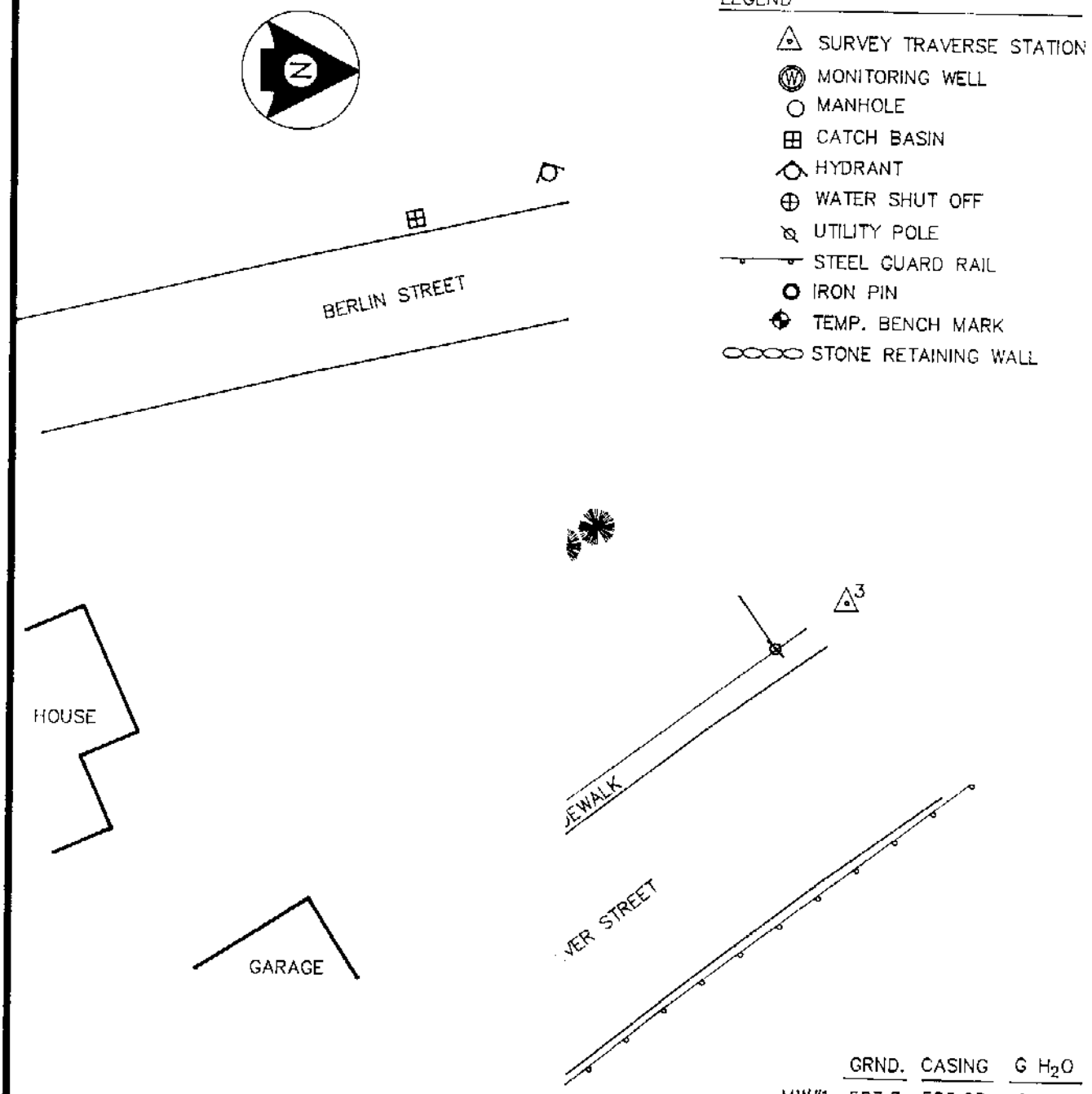
NOTE: GROUNDWATER ELEVATIONS AS OF 12/26/91

CITY OF MONTPELIER
REET PETROLEUM CONTAMINATION INVESTIGATION

TBE ISOCONCENTRATION MAP

R, VERMONT

161024	Proj. Mgr. T.S.R.	Date 1/16/92	B	



	GRND.	CASING	G H_2O
MW#1	563.3	566.63	550.05
MW#2	552.4	554.62	549.16
MW#3	553.1	555.04	543.66
DH#1	548.81		539.36
DH#2	548.7		540.0
DH#3	535.9		530.0
DH#4	540.5		533.3

NOTES:

1. ELEVATIONS ARE BASED ON TBM#2 BEING A CHIS SQUARE ON THE S.E. CORNER OF D.I. @ EL. 574. AS SHOWN ON PLAN PREPARED BY VT. A.O.T. FOR BERLIN STREET RECONSTRUCTION, DATED AP
2. TOPOGRAPHY TAKEN WITH SNOW PRESENT AND M SUBJECT TO REVISION.
3. NORTH IS MAGNETIC.

NOTE: GROUNDWATER ELEVATIONS AS OF 12/26/91

CITY OF MONTPELIER
REET PETROLEUM CONTAMINATION INVESTIGATION

- BTEX ISOCONCENTRATION MAP

R,

VERMONT

61024	Proj. Mgr. T.S.R.	Date 1/16/92	B	

APPENDIX E

Water Quality Analysis Results

Eastern Analytical, Inc. 130 Hall St., Concord, NH 03301 (603) 228-0525

November 1, 1991

DUFRESNE-HENRY, INC.

Ted Reeves
Dufresne-Henry
Precision Park
North Springfield, VT 05150

Sample Identification:
Client ID: 161024/Berlin Street
Sample Qty/Type: 4 aqueous
Date Recv'd: October 15, 1991
EAI ID: 2743 DUF

Dear Mr. Reeves:

Enclosed, please find the results of the analysis of the sample(s) identified above. This report contains the following sections:

ANALYSIS TYPE	NO. OF PAGES
• Hazardous Substance List (HSL) VOCs	1

The following standard abbreviations and conventions apply throughout all Eastern Analytical, Inc. reports:

- < = "Less than" followed by the detection limit
- TNR = Testing Not Requested
- ND = None detected, no established detection limits

If you have any questions regarding the results contained within, feel free to directly contact the chemist who performed the analysis. We appreciate this opportunity to be of service and look forward to your continued patronage.

Sincerely,

Lorraine Olashaw

Lorraine Olashaw
QA/QC Coordinator

LABORATORY REPORT

Eastern Analytical, Inc. Designation: 2743 DUF

Client: Dufresne-Henry
Sample Qty/Type: 4 aqueous

Client Designation: **161024/Berlin Street**
Date Received: October 15, 1991

Hazardous Substance List Volatile Organic Compounds

Sample ID:	1	2	3	4	
Matrix:	Aqueous	Aqueous	Aqueous	Aqueous	
Date of Analysis:	10/24/91	10/24/91	10/24/91	10/24/91	
Units:	µg/L	µg/L	µg/L	µg/L	EPA
Analyst:	NZ	NZ	NZ	NZ	Method
Dilution Factor:	100	1	10	1	
Benzene	**400**	< 1	**90**	< 1	602
Toluene	**4,000**	< 1	**80**	< 1	602
Ethylbenzene	**900**	< 1	**70**	< 1	602
Total Xylenes	**5,000**	< 1	**330**	< 1	602
MTBE	< 2000	< 20	< 200	< 20	8015

Approved By : Timothy D. Schaper

Timothy Schaper, Organics Supervisor

REPORT NO. 129127-1291

AMERICAN ENVIRONMENTAL LABORATORIES, INC.
60 Elm Hill Ave. Leominster, MA 01453
(508) 534-1444
LAB ID #MA076 800-LAB-0094

SAMPLE INFORMATION

Requested By: Dufresne-Henry, Inc.
Address: Precision Park
City: N. Springfield, VT 05150
Sample ID: PO No: 161024 / Berlin St.
Matrix: Water (City of Montpelier)
Sample Location (if different): MW-1 Date Sampled: 12/26/91

Date Received: 12/27/91
Date Analyzed: 12/30/91
Collected By: Alec Hastings
ATTN: Ted Reeves

PARAMETER	RESULT(ug/l)	MDL(ug/l)
Benzene	2,100	1.0
Chlorobenzene	ND	2.0
1,2 Dichlorobenzene	ND	2.5
1,3 Dichlorobenzene	ND	2.0
1,4 Dichlorobenzene	ND	3.0
Ethylbenzene	201	2.0
Toluene	3,400	2.0
Xylene	307	3.0
Methyl-Tert-Butyl-Ether	2,500	5.0

Comments:

EPA 602

Analyst: Eric Koslowski

★ = Exceeds EPA Proposed MCL Limits
MDL = Minimum Detection Limit
MCL LIMIT = Proposed EPA Maximum contaminant level
ND = Level present is below detection limit
NT = Not Tested

REPORT NO. 129127-1292

AMERICAN ENVIRONMENTAL LABORATORIES, INC.
60 Elm Hill Ave. Leominster, MA 01453
(508) 534-1444
LAB ID #MA076 800-LAB-0094

SAMPLE INFORMATION

Requested By: Dufresne-Henry, Inc.
Address: Precision Park
City: N. Springfield, VT 05150
Sample ID: PO No: 161024 / Berlin St.
Matrix: Water (City of Montpelier)
Sample Location if different: MW-2 Date Sampled: 12/26/91

Date Received: 12/27/91
Date Analyzed: 12/30/91
Collected By: Alec Hastings
ATTN: Ted Reeves

PARAMETER	RESULT(ug/l)	MDL(ug/l)
Benzene	ND	1.0
Chlorobenzene	ND	2.0
1,2 Dichlorobenzene	ND	2.5
1,3 Dichlorobenzene	ND	2.0
1,4 Dichlorobenzene	ND	3.0
Ethylbenzene	ND	2.0
Toluene	ND	2.0
Xylene	ND	3.0
Methyl-Tert-Butyl-Ether	ND	5.0

Comments:

EPA 602

Analyst: Eric Koslowski 9/8

★ = Exceeds EPA Proposed MCL Limits
MDL = Minimum Detection Limit
MCL LIMIT = Proposed EPA Maximum contaminant level
ND = Level present is below detection limit
NT = Not Tested

REPORT NO. 129127-1293

AMERICAN ENVIRONMENTAL LABORATORIES, INC.
60 Elm Hill Ave. Leominster, MA 01453
(508) 534-1444
LAB ID #MA076 800-LAB-0094

SAMPLE INFORMATION

Requested By: Dufresne-Henry, Inc.
Address: Precision Park
City: N. Springfield, VT 05150
Sample ID: PO No: 161024 / Berlin St.
Matrix: Water (City of Montpelier)
Sample Location (if different): DH-1 Date Sampled: 12/26/91

Date Received: 12/27/91
Date Analyzed: 12/30/91
Collected By: Alec Hastings
ATTN: Ted Reeves

PARAMETER	RESULT(ug/l)	MDL(ug/l)
Benzene	5,700	1.0
Chlorobenzene	ND	2.0
1,2 Dichlorobenzene	ND	2.5
1,3 Dichlorobenzene	ND	2.0
1,4 Dichlorobenzene	ND	3.0
Ethylbenzene	880	2.0
Toluene	1,500	2.0
Xylene	1,600	3.0
Methyl-Tert-Butyl-Ether	5,700	5.0

Comments:

EPA 602

Analyst: Eric Koslowski

★ = Exceeds EPA Proposed MCL Limits
MDL = Minimum Detection Limit
MCL LIMIT = Proposed EPA Maximum contaminant level
ND = Level present is below detection limit
NT = Not Tested

REPORT NO. 129127-1294

AMERICAN ENVIRONMENTAL LABORATORIES, INC.
60 Elm Hill Ave. Leominster, MA 01453
(508) 534-1444
LAB ID #MA076 800-LAB-0094

SAMPLE INFORMATION

Requested By: Dufresne-Henry, Inc.
Address: Precision Park
City: N. Springfield, VT 05150
Sample ID: PO No: 161024 / Berlin St.
Matrix: Water (City of Montpelier)
Sample Location (if different): DH-2 Date Sampled: 12/26/91

Date Received: 12/27/91
Date Analyzed: 12/30/91
Collected By: Alec Hastings
ATTN: Ted Reeves

PARAMETER	RESULT(ug/l)	MDL(ug/l)
Benzene	ND	1.0
Chlorobenzene	ND	2.0
1,2 Dichlorobenzene	ND	2.5
1,3 Dichlorobenzene	ND	2.0
1,4 Dichlorobenzene	ND	3.0
Ethylbenzene	ND	2.0
Toluene	ND	2.0
Xylene	ND	3.0
Methyl-Tert-Butyl-Ether	ND	5.0

Comments:

EPA 602

Analyst: Eric Koslowski

★ – Exceeds EPA Proposed MCL Limits
MDL = Minimum Detection Limit
MCL LIMIT = Proposed EPA Maximum contaminant level
ND = Level present is below detection limit
NT – Not Tested

REPORT NO. 129127-1295

AMERICAN ENVIRONMENTAL LABORATORIES, INC.
60 Elm Hill Ave. Leominster, MA 01453
508-534-1444
LAB ID #MA076 800-LAB-0094

SAMPLE INFORMATION

Requested By: Dufresne-Henry, Inc.
Address: Precision Park
City: N. Springfield, VT 05150
Sample ID: PO No: 161024 / Berlin St.
Matrix: Water (City of Montpelier)
Sample Location (if different):

Date Received: 12/27/91
Date Analyzed: 01/07/92
Collected By: Alec Hastings
ATTN: Ted Reeves

DH-3 Date Sampled: 12/26/91

PARAMETER	RESULT(ug/l)	MDL(ug/l)
Benzene	3,200	1.0
Chlorobenzene	ND	2.0
1,2 Dichlorobenzene	ND	2.5
1,3 Dichlorobenzene	ND	2.0
1,4 Dichlorobenzene	ND	3.0
Ethylbenzene	2,900	2.0
Toluene	3,400	2.0
Xylene	510	3.0
Methyl-Tert-Butyl-Ether	762	5.0

Comments:

EPA 602

Analyst: Eric Koslowski

★ = Exceeds EPA Proposed MCL Limits
MDL = Minimum Detection Limit
MCL LIMIT = Proposed EPA Maximum contaminant level
ND = Level present is below detection limit
NT = Not Tested

REPORT NO. 129127-1296

AMERICAN ENVIRONMENTAL LABORATORIES, INC
60 Elm Hill Ave. Leominster, MA 01453
(508) 534-1444
EAR ID #MA076 800-EAR-0094

SAMPLE INFORMATION

Requested By: Dufresne-Henry, Inc.
Address: Precision Park
City: N. Springfield, VT 05150
Sample ID: PO No: 161024 / Berlin St.
Matrix: Water (City of Montpelier)
Sample Location (if different): DH-4 Date Sampled: 12/26/91

Date Received: 12/27/91
Date Analyzed: 01/02/92
Collected By: Alec Hastings
ATTN: Ted Reeves

PARAMETER	RESULT(ug/l)	MDL(ug/l)
Benzene	340	1.0
Chlorobenzene	ND	2.0
1,2 Dichlorobenzene	ND	2.5
1,3 Dichlorobenzene	ND	2.0
1,4 Dichlorobenzene	ND	3.0
Ethylbenzene	ND	2.0
Toluene	660	2.0
Xylene	130	3.0
Methyl-Tert-Butyl-Ether	1,100	5.0

Comments:

EPA 602

Analyst: Eric Koslowski

★ - Exceeds EPA Proposed MCL Limits
MDL - Minimum Detection Limit
MCL LIMIT = Proposed EPA Maximum contaminant level
ND = Level present is below detection limit
NT = Not Tested

REPORT NO. 129127-1297

AMERICAN ENVIRONMENTAL LABORATORIES, INC.
60 Elm Hill Ave. Leominster, MA 01453
(508) 534-1444
LAB ID #MA076 800-T AB-0094

SAMPLE INFORMATION

Requested By: Dufresne-Henry, Inc.
Address: Precision Park
City: N. Springfield, VT 05150
Sample ID: PO No: 161024 / Berlin St.
Matrix: Water (City of Montpelier)
Sample Location (if different):

Date Received: 12/27/91
Date Analyzed: 01/02/92
Collected By: Alec Hastings
ATTN: Ted Reeves
Field Blank Date Sampled: 12/26/91

PARAMETER	RESULT(ug/l)	MDL(ug/l)
Benzene	3.2	1.0
Chlorobenzene	ND	2.0
1,2 Dichlorobenzene	ND	2.5
1,3 Dichlorobenzene	ND	2.0
1,4 Dichlorobenzene	ND	3.0
Ethylbenzene	ND	2.0
Toluene	ND	2.0
Xylene	ND	3.0
Methyl-Tert-Butyl-Ether	8.0	5.0

Comments:

EPA 602

Analyst: Eric Koslowski

★ = Exceeds EPA Proposed MCL Limits
MDL = Minimum Detection Limit
MCL LIMIT = Proposed EPA Maximum contaminant level
ND = Level present is below detection limit
NT = Not Tested